

# Package ‘geozoo’

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**Title** Zoo of Geometric Objects

**Description** The package allows geometric objects defined in geozoo to be displayed in GGobi through the use of rggobi.

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**Depends** R (>= 1.8.0), bitops, tourr

**Enhances** rggobi

**License** GPL-2

**URL** <http://streaming.stat.iastate.edu/~dicook/geometric-data/>,  
<http://www.ggobi.org>

**Repository** CRAN

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 boy.surface

*Boy Surface for GeoZoo*


---

## Description

A function to produce a Boy Surface.

## Usage

```
boy.surface(n = 10000)
```

## Arguments

n                    the number of points used when creating the object.

## Author(s)

Barret Schloerke

## See Also

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/other/>

**Examples**

```
## Generates a Boy Surface
boy.surface( n = 1000 )

## Not run:
## Through rggobi
ggobi(boy.surface(n = 10000))

## End(Not run)
```

---

`conic.spiral`*Conic Spiral*

---

**Description**

A function to produce a conic spiral

**Usage**

```
conic.spiral(n = 10000, a = 0.2, b = 1, c = 0.1, w = 2)
```

**Arguments**

n	the number of points used to generate the object.
a	final radius of cone.
b	height of object.
c	inner radius.
w	number of spirals.

**Value**

points	location of points
edges	edges of the object (null)

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/other/>

**Examples**

```
## Generates a Conic Spiral
conic.spiral( n = 1000 )

## Not run:
## Through rggobi
ggobi(conic.spiral(n = 10000))

## End(Not run)
```

---

conic.spiral.nautilus *Conic Spiral (Nautilus Shape)*

---

**Description**

A function to produce a Conic Spiral in a nautilus shape.

**Usage**

```
conic.spiral.nautilus(n = 10000, a = 0.2, b = 0.1, c = 0, w = 2)
```

**Arguments**

n	the number of points used to generate the object.
a	final radius of cone.
b	height of object.
c	inner radius.
w	number of spirals.

**Value**

points	location of points
edges	edges of the object (null)

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/other/>

**Examples**

```
## Generates a Nautilus Conic Spiral
conic.spiral.nautilus( n = 1000 )

## Not run:
## Through rggobi
ggobi(conic.spiral.nautilus(n = 10000))

## End(Not run)
```

---

cross.cap

*Cross Cap*

---

**Description**

A function to generate a cross cap.

**Usage**

```
cross.cap(n = 10000)
```

**Arguments**

n                    number of points used to generate the object.

**Value**

points                location of points  
edges                 edges of the object (null)

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/other/>

**Examples**

```
## Generates a Cross Cap
cross.cap( n = 1000 )

## Not run:
## Through rggobi
ggobi(cross.cap(n = 10000))

## End(Not run)
```

---

cross.polytope	<i>Cross Polytope</i>
----------------	-----------------------

---

**Description**

A function generate a cross polytope, cube dual, with vertices and a wire frame.

**Usage**

```
cross.polytope(p = 3)
```

**Arguments**

p	dimension of object
---	---------------------

**Value**

points	location of points
edges	edges of the object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/cube/>

**Examples**

```
## Generates a 3-D Cross Polytope
cross.polytope(p = 3)

## Not run:
## Through rggobi in 4-D
ggobi(cross.polytope(p = 4))

## End(Not run)
```

---

cube.dotline	<i>Cube with points along the wire frame</i>
--------------	--

---

**Description**

A functions to generate a cube with points along its wire frame.

**Usage**

```
cube.dotline(p = 3)
```

**Arguments**

p	dimension of object
---	---------------------

**Value**

points	location of points
edges	edges of the object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/cube/>

**Examples**

```
## Generates a cube with points along its wire frame
cube.dotline(p = 3)

## Not run:
## Through rggobi
ggobi(cube.dotline(p = 3))

## End(Not run)
```

---

cube.face	<i>Cube with points on the 'face'.</i>
-----------	--

---

**Description**

A function to generate a cube with points on its face.

**Usage**

```
cube.face(p = 3)
```

**Arguments**

p	dimension of object
---	---------------------

**Value**

points	location of points
edges	edges of the object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/cube/>

**Examples**

```
## Generates a cube with points on its face
cube.face(p = 3)

## Not run:
## Through rggobi
ggobi(cube.face(p = 3))

## End(Not run)
```

---

cube.iterate	<i>Cube</i>
--------------	-------------

---

**Description**

A function generate a cube with vertices and a wire frame.

**Usage**

```
cube.iterate(p = 3)
```

**Arguments**

p	dimension of object
---	---------------------

**Value**

points	location of points
edges	edges of the object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/cube/>

**Examples**

```
## Generates a cube
cube.iterate(p = 3)

## Not run:
## Through rggobi
ggobi(cube.iterate(p = 3))

## End(Not run)
```

---

cube.solid.grid      *Equidistant Solid Cube*

---

### Description

A function to generate a solid cube with equidistant points.

### Usage

```
cube.solid.grid(p = 3, n = 8)
```

### Arguments

p	dimension of object
n	length of number of points in each dimension

### Value

points	location of points
edges	edges of the object

### Author(s)

Barret Schloerke

### References

<http://streaming.stat.iastate.edu/~dicook/geometric-data/cube/>

### Examples

```
## Generates a solid cube with equidistant points
cube.solid.grid(p = 3, n = 8)

## Not run:
## Through rggobi
ggobi(cube.solid.grid(p = 3, n = 8))

## End(Not run)
```

---

cube.solid.random	<i>Solid Cube</i>
-------------------	-------------------

---

**Description**

A function to generate a solid cube with random points.

**Usage**

```
cube.solid.random(p, n = 850 * 2^p)
```

**Arguments**

p	dimension of object
n	number of points in object

**Value**

points	location of points
edges	edges of the object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/cube/>

**Examples**

```
## Generates a solid cube with random points
cube.solid.random(p = 3, n = 1000)

## Not run:
## Through rggobi
ggobi(cube.solid.random(p = 3,))

## End(Not run)
```

dini.surface

*Dini Surface*

---

**Description**

A function to generate a dini surface.

**Usage**

```
dini.surface(n = 10000, a = 1, b = 1)
```

**Arguments**

n	number of points
a	outer radius of object
b	space between loops

**Value**

points	location of points
edges	edges of the object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/mobius/other/>

**Examples**

```
## Generates a Dini surface
dini.surface(n = 1000, a = 1, b = 1)

## Not run:
## Through rggobi
ggobi(dini.surface(n = 10000, a = 1, b = 1))

## End(Not run)
```

---

ellipsoid	<i>Ellipsoid</i>
-----------	------------------

---

**Description**

A function to generate an ellipsoid.

**Usage**

```
ellipsoid(n = 10000, a = 1, b = 1, c = 3)
```

**Arguments**

n	number of points
a	radius in x direction
b	radius in y direction
c	radius in z direction

**Value**

points	location of points
edges	edges of the object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/other/>

**Examples**

```
## Generates an ellipsoid
ellipsoid(n = 1000, a = 1, b = 1, c = 3)

## Not run:
## Through rggobi
ggobi(ellipsoid(n = 10000, a = 1, b = 1, c = 3))

## End(Not run)
```

enneper.surface      *Enneper's Surface*

---

### Description

A function to generate Enneper's surface.

### Usage

```
enneper.surface(n = 10000, a = 4)
```

### Arguments

n	number of points
a	angle, radians, minimum and maximum. $-a < \text{angle} < a$

### Value

points	location of points
edges	edges of the object

### Author(s)

Barret Schloerke

### References

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/other/>

### Examples

```
## Generates an Enneper Surface
enneper.surface(n = 1000, a = 4)

## Not run:
## Through rggobi
ggobi(enneper.surface(n = 10000, a = 4))

## End(Not run)
```

---

ggobi.geozoo	<i>GGobi adaptation for GeoZoo</i>
--------------	------------------------------------

---

**Description**

Allows GeoZoo objects to be put into GGobi through rggobi with a pre-specified color and 2D Tour mode. ggobi.

**Usage**

```
ggobi.geozoo(data, ...)
```

**Arguments**

data	The geozoo data object to view
...	ignored arguments

**Examples**

```
## Not run:  
ggobi(cube.iterate(p = 3))  
  
ggobi(simplex(p=4))  
  
## End(Not run)
```

---

klein.fig.eight	<i>Figure Eight Klein Bottle</i>
-----------------	----------------------------------

---

**Description**

A function to generate a figure eight Klein bottle.

**Usage**

```
klein.fig.eight(n = 10000, a = 3, b = 1)
```

**Arguments**

n	number of points
a	radius of outer radius
b	radius of inner radius

**Author(s)**

Barret Schloerke

## References

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/other/>

## Examples

```
## Generates a figure eight Klein bottle.
klein.fig.eight(n = 1000, a = 3, b = 1)

## Not run:
## Through rggobi
ggobi(klein.fig.eight(n = 10000, a = 3, b = 1))

## End(Not run)
```

---

mobius

*Mobius*

---

## Description

A function to generate a mobius strip in the third or fourth dimension.

## Usage

```
mobius(p=3, n = 10000)
```

## Arguments

p	dimension of object. (3)
n	number of points

## Author(s)

Barret Schloerke

## References

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/mobius/>

## Examples

```
## Generates a mobius strip.
mobius(3, n = 1000)

## Not run:
## Through rggobi
ggobi(mobius(3, n = 10000))

## End(Not run)
```

---

mobius.experiment	<i>Mobius</i>
-------------------	---------------

---

**Description**

A function to generate a 5-D mobius strip in the third dimension.

**Usage**

```
mobius.experiment(p=5, n = 10000)
```

**Arguments**

p	dimension of object. (5)
n	number of points

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/mobius/>

**Examples**

```
## Generates a mobius strip.
mobius.experiment(5, n = 1000)

## Not run:
## Through rggobi
ggobi(mobius.experiment(5, n = 10000))

## End(Not run)
```

---

print.geozoo	<i>Print</i>
--------------	--------------

---

**Description**

Prints GeoZoo objects with tourr or prints them

**Arguments**

x	geozoo object
...	other arguments

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/>

**Examples**

```
example(boy.surface)
example(cube.face)
```

---

roman.surface

*Roman Surface*

---

**Description**

A function to generate a Roman surface, also known as a Steiner surface.

**Usage**

```
roman.surface(n = 10000, a = 1)
```

**Arguments**

n	number of points
a	maximum radius of object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/other/>

**Examples**

```
## Generates a Roman surface.
roman.surface(n = 1000, a = 1)

## Not run:
## Through rggobi
ggobi(roman.surface(n = 10000, a = 1))

## End(Not run)
```

---

simplex	<i>Simplex</i>
---------	----------------

---

**Description**

A function to generate a simplex.

**Usage**

```
simplex(p = 3)
```

**Arguments**

p                    dimension of object

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/simplex/>

**Examples**

```
## Generates a simplex
simplex(p = 3)

## Not run:
## Through rggobi
ggobi(simplex(p = 3))

## End(Not run)
```

---

sphere.hollow	<i>Sphere</i>
---------------	---------------

---

**Description**

A function to generate a sphere with points on the surface.

**Usage**

```
sphere.hollow(p, n = p * 500)
```

**Arguments**

p                    dimension of object  
n                    number of points

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/sphere/>

**Examples**

```
## Generates a sphere with points on the surface.  
sphere.hollow(p = 3, n = 1000)  
  
## Not run:  
## Through rggobi  
ggobi(sphere.hollow(p = 4))  
  
## End(Not run)
```

---

sphere.solid.grid        *Solid Sphere with Equidistant Points*

---

**Description**

A function to generate a solid sphere with equidistant points.

**Usage**

```
sphere.solid.grid(p = 3, n = 8)
```

**Arguments**

p                    dimension of object  
n                    maximum number of points in the diameter

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/sphere/>

**Examples**

```
## Generates a solid sphere with equidistant points
sphere.solid.grid(p = 3, n = 8)

## Not run:
## Through rggobi
ggobi(sphere.solid.grid(p = 4, n = 5))

## End(Not run)
```

---

sphere.solid.random     *Solid sphere with Random Points*

---

**Description**

A function to generate a solid sphere with random points.

**Usage**

```
sphere.solid.random(p, n = p * 500)
```

**Arguments**

p	dimension of object
n	number of points

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/sphere/>

**Examples**

```
## Generates a solid sphere with random points.
sphere.solid.random(p = 3, n = 1000)

## Not run:
## Through rggobi
ggobi(sphere.solid.random(p = 5))

## End(Not run)
```

torus

*Torus*

---

**Description**

A function to generate a torus in any dimension.

**Usage**

```
torus(p = 3, n = 10000)
```

**Arguments**

p	dimension of object
n	number of points

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/torus/>

**Examples**

```
## Generates a torus.  
torus(p = 3, n = 1000)  
  
## Not run:  
## Through rggobi  
ggobi(torus(p = 4, n = 5000))  
  
## End(Not run)
```

---

torus.flat*Flat Torus*

---

**Description**

A function to generate a flat torus in any dimension.

**Usage**

```
torus.flat(p = 4, n = 10000)
```

**Arguments**

p                    dimension of object. (number of circles x2)  
n                    number of points

**Author(s)**

Barret Schloerke

**References**

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/torus/>

**Examples**

```
## Generates a Flat Torus.  
torus <- torus.flat(p = 4, n = 1000)  
  
## Not run:  
## Through rggobi  
ggobi(torus.flat(p = 6, n = 10000))  
  
## End(Not run)
```

---

write.xml

*Write XML's*

---

**Description**

A function that allows the user to write an object into an .xml.

**Usage**

```
write.xml(object.function, filepath, title)
```

**Arguments**

object.function                    i.e. cube() or sphere()  
filepath                    where you would like to save the file in quotes  
title                    title of the file in quotes

**Author(s)**

Barret Schloerke

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